opposed theories, be made even still stronger than any yet stated; for the *same metals* in the *same add* of the *same strength at the two sides* may be made to change their order, as the chemical action of the acid on each particular metal is affected, by dilution, in a smaller or greater degree.

988. A voltaic association of iron and silver was dipped, both metals at once, into the same strong nitric acid; for the first instant, the iron was positive; the moment after, the silver became positive, and continued so. A similar association of iron and silver was put into weak nitric acid, and the iron was immediately positive, and continued so. With iron and copper the same results were obtained.

989. These, therefore, are *finally* cases of such an inversion (987), but as the iron in the strong nitric acid acquires a state the moment after its immersion which is probably not assumed by it in the weak acid (831, 939, 1021), and as the action on the iron in its *ordinary* state may be said to be to render it positive to the silver or copper, both in the strong or weak acid, we will not endeavour to force the fact, but look to other metals.

990. *Silver and nickel* being associated in weak nitric acid, the nickel was positive; being associated in strong nitric acid, the nickel was still positive at the first moment, but the silver was finally positive. The nickel lost its superiority through the influence of an investing film (906); and though the effect might easily pass unobserved, the case cannot be allowed to stand, as fulfilling the statement made (987).

991. *Copper and nickel* were put into strong nitric acid; the copper was positive from the first moment. Copper and nickel being in dilute nitric acid, the nickel was slightly but clearly positive to the copper. Again, *zinc and cadmium* in strong nitric acid; the cadmium was positive strongly to the zinc; the same metals being in dilute nitric acid, the zinc was very positive to the cadmium. These I consider beautiful and unexceptionable cases (987).

992. Thus the nitric acid furnishes a most wonderful variety of effects when used as the electrolytic conductor in voltaic circles; and its difference from sulphuric acid (983) or from potassa (982) in the phenomena consequent upon

dilution, tend,
in conjunction with many preceding facts and arguments, to
show that the electromotive force in a circle is not the con-
sequence of any power in bodies generally, belonging to them
in classes rather than as individuals, and having that simplicity